

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A catheter for removing core material from one or more plaque deposits on an inside wall of a blood vessel, said catheter comprising:

an elongate shaft having a proximal end and a distal end; and

a radially extendible collection array disposed about a portion of the elongate shaft and near the distal end of the elongated shaft, the radially extendible collection array having one or more collection lumens open to the blood vessel to receive the core material at the periphery of the blood vessel, remove the core material from the blood vessel, and maintain the core material out of the blood vessel,

wherein each collection lumen is defined, at least in part, by a first circumferential wall, a second circumferential wall, a first radial wall, and a second radial wall.

2. (Previously Amended) The catheter of claim 1 further comprising a retrieval port near the proximal end of the elongate shaft and a suction means fluidly coupled to the retrieval port.

3. (Original) The catheter of claim 1, wherein the collection array is radially extendible and radially collapsible.

4. (Original) The catheter of claim 1 further comprising means for radially extending and/or radially collapsing the collection array.

5. (Previously Amended) The catheter of claim 4, wherein the means for radially extending and/or radially collapsing the collection array includes a hydraulic mechanism.

6. (Previously Amended) The catheter of claim 5, wherein the hydraulic mechanism comprises a balloon, said balloon having an inflated state and a deflated state.

7. (Previously Amended) The catheter of claim 4, wherein the means for radially extending and/or radially collapsing the collection array includes a mechanical mechanism.

8. (Cancelled)

9. (Currently amended) The catheter of claim 8 1, wherein for each collection lumen, said first and second radial walls are disposed between said first and second circumferential walls.

10. (Currently amended) The catheter of claim 8 1, wherein at least one of the radial walls is substantially more rigid than said first and second circumferential walls.

11. (Currently amended) The catheter of claim 8 1, wherein the first circumferential wall defines, at least in part, an outer surface of a balloon.

12. (Currently amended) The catheter of claim 8 1, wherein said first and second circumferential walls and said first and second radial walls are constructed and arranged such that the collection array is collapsible into a predefined shape.

13. (Previously Amended) The catheter of claim 1, wherein the distal end of each of the one or more collection lumens comprises a collection port.

14. (Previously Amended) The catheter of claim 13, wherein at least one collection port is fluidly connectible to a suction means.

15. (Previously Amended) The catheter of claim 13, wherein at least one collection port is directed substantially axially.

16. (Original) The catheter of claim 13, wherein at least one collection port is directed radially.

17. (Previously Amended) The catheter of claim 13, further comprising a retrieval port near the proximal end of the elongate shaft, wherein at least one collection lumen provides fluid communication between the retrieval port and at least one collection port.

18. (Previously Amended) The catheter of claim 1, wherein an outer circumferential wall of the collection array defines, at least in part, an outer extent of an engagement surface for: engaging the inner wall of the blood vessel and the one or more plaque deposits; rupturing the one or more plaque deposits in one or more locations; and urging core material from the one or more ruptured plaque deposits.

19. (Withdrawn) A system for removing core material from one or more plaque deposits on an inside wall of a blood vessel, said system comprising:
a catheter comprising an elongated shaft with radially extendible and/or radially collapsible collection array with the distal end of the collection array disposed about a portion of the elongated shaft proximate the distal end of the elongated shaft;
means for rupturing the one or more plaque deposits in one or more locations; and
one or more collection ports for extracting thrombi, debris, core material urged from the one or more ruptured plaque deposits, etc., from the lumen of the blood vessel.

20. (Withdrawn) The system of claim 19 further comprising means for radially extending and/or radially collapsing the collection array.

21. (Withdrawn) The system of claim 19 wherein the collection array comprises a plurality of collection lumens.

22. (Withdrawn) A method for removing core material from one or more plaque deposits on an inside wall of a blood vessel, said method comprising the steps of:
providing a catheter comprising an elongated shaft with radially extendible and/or radially collapsible collection array with the distal end of the collection array disposed about a portion of the elongated shaft proximate the distal end of the elongated shaft;
inserting the distal end of the catheter into a lumen of the blood vessel;
positioning the distal end of the collection array proximate one or more plaque deposits;
extending the collection array to engage the inner surface of the blood vessel and the one or more plaque deposits, rupturing the one or more plaque deposits in one or more locations, and urging the core material from the one or more ruptured plaque deposits; and
extracting thrombi, debris, core material urged from the one or more ruptured plaque deposits, etc., from the lumen of the blood vessel using suction means fluidly coupled to the proximal end of the collection array.

23. (Previously Presented) The catheter of claim 13, further comprising one or more retrieval ports near the proximal end of the elongate shaft, wherein the one or more retrieval ports correspond to the one or more collection lumens.

24. (Previously Presented) The catheter of claim 15, wherein the at least one axially-directed collection port is directed away from the proximal end of the elongate shaft.

25. (Previously Presented) The catheter of claim 15, wherein the at least one axially-directed collection port is directed toward the proximal end of the elongate shaft.